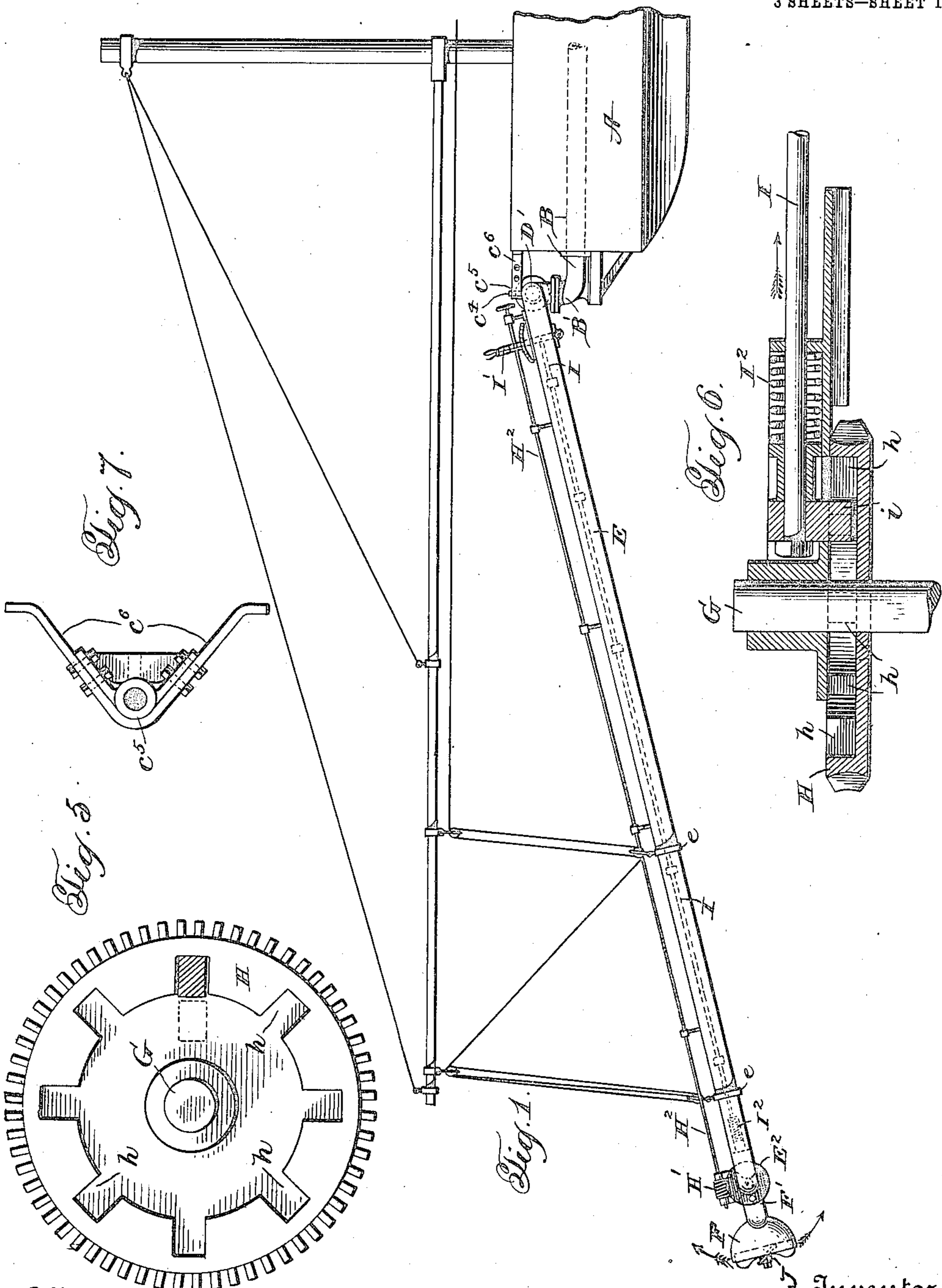


W. T. WEAVER.
 CUTTER HEAD FOR HYDRAULIC DREDGES.
 APPLICATION FILED FEB. 11, 1909.

962,540.

Patented June 28, 1910.

3 SHEETS—SHEET 1.



Witnesses:

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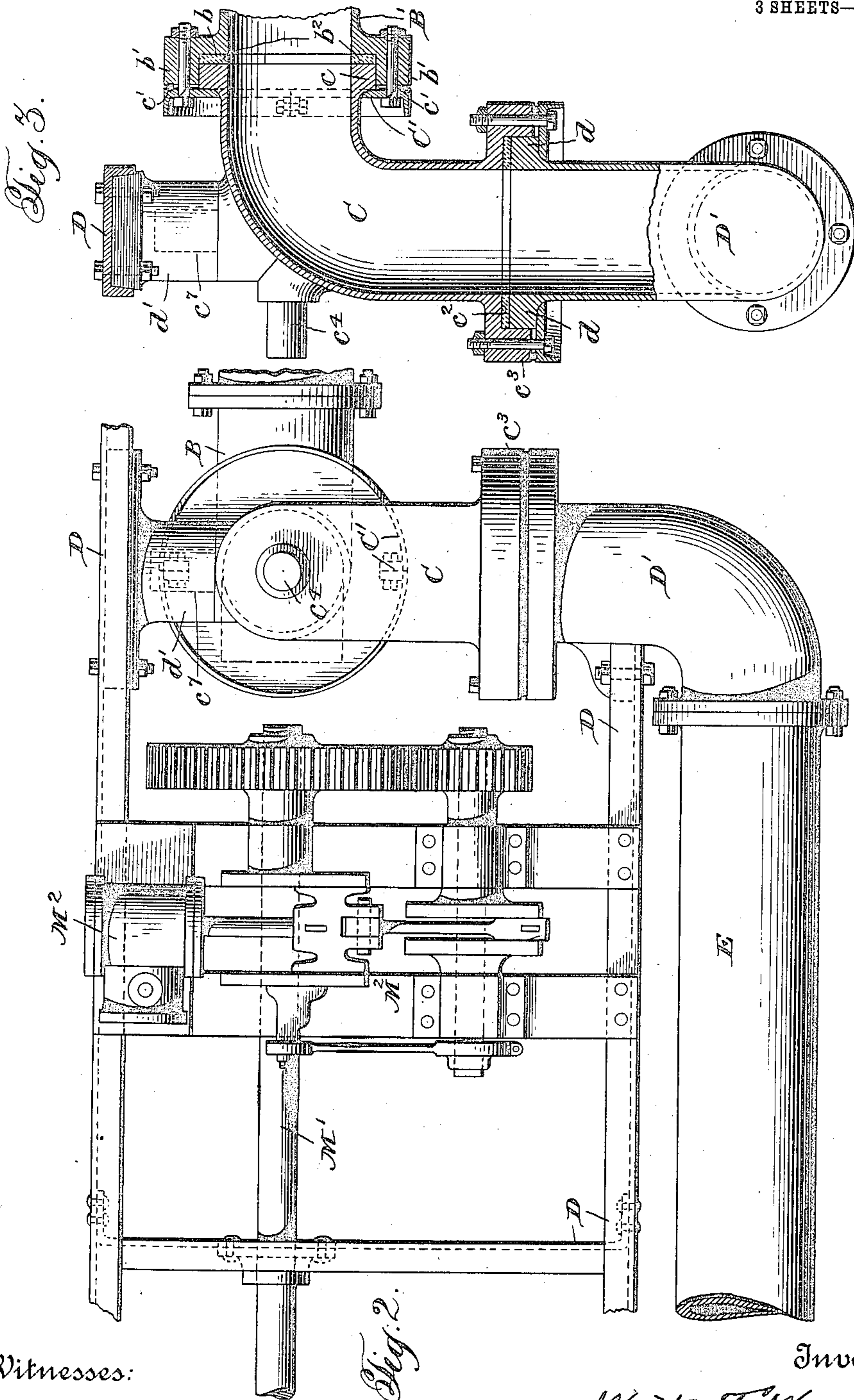
By T. McMillan Attorneys

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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

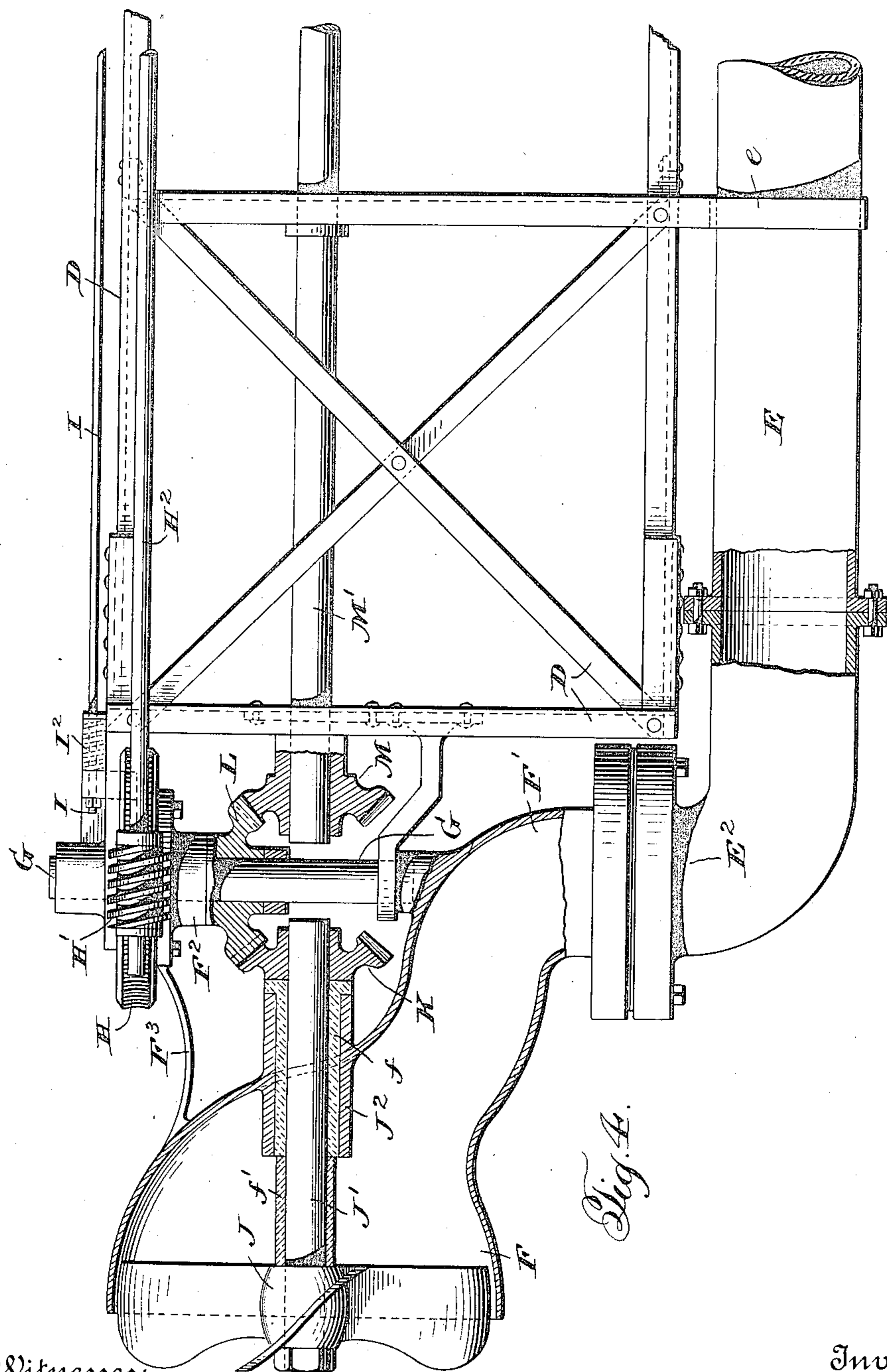


Fig. 4.

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UNITED STATES PATENT OFFICE.

WALTER T. WEAVER, OF GULFPORT, MISSISSIPPI.

CUTTER-HEAD FOR HYDRAULIC DREDGES.

962,540.

Specification of Letters Patent. Patented June 28, 1910.

Application filed February 11, 1909. Serial No. 477,357.

To all whom it may concern:

Be it known that I, WALTER T. WEAVER, a citizen of the United States, residing at Gulfport, in the county of Harrison and State of Mississippi, have invented certain new and useful Improvements in Cutter-Heads for Hydraulic Dredges, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to an improvement in hydraulic dredges and more particularly to that type of hydraulic dredges in which a rotary cutter head is employed at the lower end of the suction pipe.

The object of the present invention is the provision of a cutter head of improved construction which can be angularly adjusted relatively to the suction pipe and of improved means for effecting such adjustment from the hull of the dredger.

A further object of the invention is the provision of means for locking the adjustable cutter head in any desired position of adjustment relatively to the suction pipe.

A further object of the invention is the provision in a device of this character of a suction pipe which is so supported that it is capable of a very wide range of swinging movement in all directions relatively to the dredger.

A further object of the invention is the provision of an improved ladder construction for supporting the suction pipe so that it will not be subjected to strains when in use and when moved to the various positions to which it is capable of being adjusted.

A further object of the present invention is the provision of improved means for coupling the several movable parts of the suction pipe together so that leakage will be prevented at these points and so that the joints will be protected from injury from the mass of material drawn through the suction pipe.

Other objects of the invention will be apparent from the detail description hereinafter when read in connection with the accompanying drawings wherein a convenient embodiment of the invention is shown and wherein like letters of reference refer to similar parts in the several views.

In the drawings: Figure 1 is a side elevation of my improved dredger. Fig. 2 is a plan view of the top of the ladder. Fig. 3 is a sectional view, partly in elevation, showing the manner of mounting the suction

pipe on the upper portion of the ladder and dredge. Fig. 4 is a plan view, partly in section, of the lower portion of the ladder and cutter head. Figs. 5, 6 and 7 are detail views.

Referring now to the drawings, A designates a floating vessel used for carrying the dredging apparatus.

B designates the fixed portion of the suction pipe which is positioned within the vessel A and the forward portion of which projects without the bow of the boat and terminates in an upwardly extending elbow B', the upper end of which is provided with a flat face *b* which is surrounded by an upwardly extending flange *b'*.

C designates an elbow shaped pipe, the lower end of which is provided with a laterally projecting flange *c* which is adapted to fit within the upwardly extending flange *b'* so as to form a swiveled joint between the elbow pipes B' and C, a seat *b²* of copper or steel being interposed between the end of the elbow C and the flat face *b* of the elbow pipe B'. The lower end of the elbow C is held to its seat by means of a split ring C' which encircles the same and overlies the laterally projecting flange *c* thereof, said ring being clamped by suitable clamping bolts to the upwardly extending flange *b'* of the elbow B', a suitable packing *c'* of rubber or other material being interposed between the split collar C' and the flange *b'* to insure the formation of an absolutely air tight joint between the elbows C and B. The joint thus formed is much more effective than the joints heretofore employed between the movable sections of the suction pipe and also much more durable as the steel or copper seats *b²* will last for an exceedingly long time and can readily be replaced when worn. The horizontal arm of the elbow C is provided at the outer end thereof with a flat face *c²* and with an outwardly projecting annular flange *c³* surrounding the same, for a purpose to be hereinafter described.

The elbow C is swiveled to the elbow B' in the manner heretofore described in order that the movable section of the suction pipe which is adapted to be coupled thereto, as will be hereinafter more particularly set forth, may be swung laterally of the boat or vessel A and in order that the weight of the movable section of the suction pipe will not be borne wholly by the coupling between the elbows C and B', which would not only

cause the parts to bind and render the same difficult to adjust but would also tend to produce leakage at that point, the elbow C is provided at the top thereof with an upwardly extending hinge pintle c^4 in axial alinement with the downwardly extending arm thereof, which pintle is adapted to work in a bearing c^5 which is bolted in the apex of a V-shaped strap c^6 which in turn is bolted or otherwise secured to the bow of the boat. The elbow C is also provided with an outwardly projecting hinge pintle c^7 in axial alinement with the horizontal arm thereof for a purpose to be hereinafter set forth.

D designates a ladder which is formed preferably of angle iron and the side bars of which are connected at suitable intervals by transverse connecting bars and crossed braces.

E designates the movable section of the suction pipe which is rigidly clamped by means of straps e or in any other suitable manner to one of the side bars of the ladder D and is provided at its upper end with an elbow D', one arm of which extends laterally and is provided at its end with a laterally projecting annular flange d , which is adapted to fit within the annular flange c^3 at the end of the elbow C so as to permit the ladder and the section of the suction pipe E carried thereby to be moved up and down to any desired extent. The means employed for forming an air tight swiveled joint between the elbow D' and the elbow C are identical with the coupling means heretofore described, used for joining the elbows C and B' and need not therefore be again described in detail. The side rail of the ladder D opposite to which the section of suction pipe is clamped is provided at its upper end with a bearing d' which loosely engages the pintle c^7 projecting from the elbow C. From this construction it will be apparent that the ladder and consequently the portion of the suction pipe carried thereby can be shifted laterally to any desired extent and can also be moved vertically and that the parts of the device are so constructed that these movements are obtained without subjecting the joints of the suction pipe to any strains whatever. The lower end of the portion E of the suction pipe which is secured to the ladder D has secured thereto an inwardly extending elbow E².

F designates a cutter head casing, the mouth of which is substantially circular in cross section. Extending rearwardly from the cutter head casing F and positioned at one side of the center thereof is a pipe F', the end of which is bent laterally and connected by a swiveled joint to the end of the inwardly extending elbow E² at the end of the pipe E thereby forming a connection permitting the cutter head casing to be adjusted angularly with reference to the lower

end of the suction pipe. The construction of the swiveled joint between the pipe F' and elbow E² is similar to that heretofore described in connection with the elbows C and B and need not therefore be again described in detail.

Fixedly secured in suitable bearings in the lower end of the ladder frame D and positioned in axial alinement with the laterally bent portion of the pipe F' extending from the cutter head casing F is a shaft G, one end of which fits into and loosely engages a bearing formed on the rear of the pipe F', while the other end of said shaft has loosely mounted thereon a bearing F² which is carried by a bracket F³ which is formed integral with and projects rearwardly from the casing head F. It will thus be seen that the pivotal movement of the cutter head casing is about the shaft G and that there is no strain upon the swiveled joint between the pipe F' and elbow E² regardless of the position to which the cutter head casing is adjusted.

Rigidly secured to the bearing F² in any suitable manner is a worm wheel H, with which meshes a worm H' which is carried by a shaft H² journaled in suitable bearings carried by the ladder D. The shaft H² extends the full length of the ladder and is provided at its upper end with a hand wheel so that the adjustment of the cutter head and its casing can be effected from the hull of the dredger. The outer face of the worm wheel H is dished and in the annular wall surrounding said dished portion are a plurality of equi-distant notches h .

Slidably mounted in suitable bearings carried by the ladder D is a shaft I, the lower end of which is provided with a laterally extending latch i which projects into the dished portion of the worm wheel and is adapted to be moved into engagement with one of the notches heretofore referred to. The shaft I extends the full length of the ladder D and is connected at its upper end to a lever I' which works over a suitable rack the lever being provided with the usual pawl to hold the same in various positions of adjustment. The lower end of the shaft I is surrounded by a spring I² which bears against an abutment on the shaft and serves to normally hold the latch i out of engagement with the notches h in the worm wheel H.

In use, after the cutter head and casing have been adjusted to the desired extent, the lever I' is actuated to draw the latch into engagement with one of the notches h of the worm wheel and its pawl caused to engage its rack thereby locking the parts in their adjusted position. Should it be desired to further adjust the cutter head and cutter head casing, the lever I' is released from its rack when the spring I² immediately forces the latch i out of engagement with the notch

h in the worm wheel after which the cutter head and cutter head casing can be adjusted to any desired position.

J designates a cutter head which is positioned directly at the mouth of the cutter head casing F and is formed so as to throw all the dirt and other matter into the suction pipe with some force. The cutter J is carried by a shaft J' journaled in a bearing J² positioned axially of the cutter head casing F said bearing being provided with a bushing f of brass. The portion of the shaft J' between the cutter J and the bearing J² is surrounded by a sleeve f' of steel to prevent sand and gravel from cutting the same. The shaft J' projects without the rear of the cutter head casing F and has keyed or otherwise rigidly secured thereto a bevel gear K which meshes with a bevel gear L loosely mounted on the fixed shaft G secured in the ladder frame. Meshing with the bevel gear L is a bevel gear M which is carried by an operating shaft M' which is journaled in suitable bearings carried by the ladder D. The operating shaft M' extends substantially the length of the ladder and is preferably actuated by means of an engine M² of any convenient type which is mounted directly upon the ladder, any convenient form of gearing being interposed between the crank shaft of the engine and the operating shaft.

The vessel A is provided with a mast, boom and block and tackle devices for raising and lowering the ladder and suction pipe which may be of any convenient or well known construction.

While a convenient embodiment of the invention is illustrated in the accompanying drawings, it will be obvious that many changes may be made to the construction therein shown without departing from the spirit and scope of the invention as defined in the appended claims.

Having thus described the invention, what is claimed is:

1. In a dredging machine, a swinging suction pipe, a cutter head casing swiveled to the lower end of said suction pipe, a cutter head in said casing, a worm wheel carried by the cutter head casing, a worm gear engaging said worm wheel, and means for locking the cutter head casing in various positions of adjustment.

2. In a dredging machine, a swinging ladder, a suction pipe carried thereby, a cutter head casing swiveled to the lower end of said suction pipe, a cutter head mounted in said casing and adjustable therewith, and means operable from the upper end of the ladder for adjusting the cutter head casing and for locking the same in various positions of adjustment.

3. In a dredging machine, a swinging suction pipe, a cutter head casing pivoted to

the lower end of said suction pipe, a cutter head in said casing, a worm wheel carried by the cutter head casing, a worm engaging said worm wheel, and a lock adapted to engage the worm wheel to hold the cutter head casing in various positions of adjustment.

4. In a dredging machine, a ladder, a suction pipe carried thereby, a cutter head casing pivoted to the lower end of the ladder and having a swiveled connection with the lower end of the suction pipe, a cutter head in said casing, a worm wheel carried by the cutter head casing, an operating shaft extending substantially the full length of the ladder, and a worm carried by said shaft and engaging said worm wheel.

5. In a dredging machine, a ladder, a suction pipe carried thereby and having its lower end extending inwardly, a fixed shaft carried by the lower end of the ladder and positioned in axial alinement with the inwardly extending portion of the suction pipe, a cutter head casing pivoted on said shaft and having a swiveled connection with the inwardly extending portion of the suction pipe.

6. In a dredging machine, a ladder, a suction pipe carried thereby having its lower end extended inwardly, a fixed shaft carried by the lower end of the ladder and positioned in axial alinement with the inwardly extended portion of the suction pipe, a cutter head casing pivoted on said shaft and having a swiveled connection with the inwardly extended portion of the suction pipe, a cutter head journaled in said cutter head casing, means for adjusting the cutter head casing, and means for rotating the cutter head.

7. In a dredging machine, a ladder, a suction pipe carried thereby having its lower end extended inwardly, a fixed shaft carried by the lower end of the ladder and positioned in axial alinement with the inwardly extended portion of the suction pipe, a cutter head casing pivoted on said shaft and having a swiveled connection with the inwardly extended portion of the suction pipe, a gear wheel loosely mounted on the fixed shaft, a cutter head shaft journaled in said cutter head casing and provided with a gear wheel meshing with the gear wheel mounted on the fixed shaft, and an operating shaft mounted on the ladder and provided with a gear wheel meshing with the gear wheel mounted on said fixed shaft.

8. In a dredging machine, a ladder, a suction pipe carried thereby and having its lower end extended inwardly, a fixed shaft carried by the lower end of the ladder and positioned in axial alinement with the inwardly extended portion of the suction pipe, a cutter head casing pivoted on said shaft and having a swiveled connection with the inwardly extended portion of the suction

pipe, a worm wheel carried by the cutter head casing, a shaft journaled on the ladder and provided with a worm meshing with said worm wheel, a gear loosely mounted on the fixed shaft carried by the ladder, a cutter head shaft journaled in the cutter head casing and provided with a gear meshing with the gear on said fixed shaft, and an operating shaft provided with a gear meshing with the gear on said fixed shaft.

9. In a dredging machine, the combination with a vessel, of a fixed pipe carried thereby, an elbow swiveled to said fixed pipe so as to swing laterally of the vessel, a ladder pivotally connected to said elbow in axial alinement with the horizontal arm thereof, and a suction pipe carried by said ladder and having a rotatable connection at its upper end with the horizontal arm of said elbow.

10. In a dredging machine, the combination with a vessel, of a fixed pipe carried thereby and provided with an upturned end, a bearing carried by the vessel and positioned in axial alinement with the upturned end of said fixed pipe, an elbow coupling rotatably mounted on the upturned end of said fixed pipe and provided with a pintle engaging the bearing secured to the vessel, and a suction pipe movably connected to the end of said elbow coupling.

11. In a dredging machine, the combination with a vessel; of a fixed pipe carried thereby having an upturned end, of an el-

bow coupling swiveled to the upturned end of said pipe, said coupling being provided with pintles extending therefrom in axial alinement with the arms thereof, a bearing secured to the vessel and loosely engaging the pintle positioned in axial alinement with the vertical arm of said elbow coupling, a ladder having a pivotal connection with the other pintle of the coupling, and a suction pipe carried by the ladder and having a rotatable connection with the horizontal arm of said elbow coupling.

12. In a dredging machine, a suction pipe formed of sections, one of said sections being provided with an outwardly extending flange at the end thereof and the other of said sections with a laterally extending flange at the end thereof adapted to fit within the outwardly extending flange on said first mentioned section, a removable metallic seat interposed between the ends of said sections, a collar on the last mentioned section overlying the laterally extending flange thereof, a flexible packing between said collar and the upwardly extending flange of said first mentioned section, and means for clamping the collar to the flange of the first mentioned section.

In testimony whereof I affix my signature in presence of two witnesses.

WALTER T. WEAVER.

Witnesses:

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DAVID E. MORRIS.